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Theatrical Place in a 3D CVE:

An Online Performance of Plato's Allegory of the Cave in a Distributed 3D CVE

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Abstract—**This paper discusses a theatrical performance in a 3D collaborative virtual environment (3D CVE). Place in a performative 3D CVE is contingent on immersion and presence generated by social interaction. It discusses the production of an online performance of Plato's *Allegory of the Cave* involving students from three different continents. It was found that theatrical activities in a 3D CVE share some of the characteristics of both cinema and traditional theatre. The paper identifies different types of places in 3D CVE and discusses their role in an educational context.**

Keywords - E-learning; Theatrical roleplaying; Collaborative work; 3D CVE; Cross-Cultural Collaboration.

I. INTRODUCTION

This paper discusses how the cyber-space of a 3D collaborative virtual environment (3D CVE) can serve as an arena for a theatrical performance, especially in an educational and multicultural context. It is part of a system developed over a number of years of previous use of remote collaboration 3D CVEs by the authors [see 1, 2, 3]. It traces how notions of theatrical space inform our concepts of place. As a concept, place is difficult to understand. There are different views on what place is. They include philosophical, architectural, urban, psychological, and CSWC views, among others. Of interest to this paper is the notion of place in a performative 3D CVE. Place in such a 3D CVE is contingent on immersion and presence. These are generated by social interaction. Hence, the theatrical performance was chosen as a case study highlighting the creation of places for social interaction to occur.

The metaphor of "virtual stage" or "virtual theatre" has already been adopted in a number of 3D educational environments, e.g. worlds in AWEDU [4]. Though this metaphor seldom exists in a "pure" form, its elements are present almost everywhere as users in 3D CVE always "play" a certain role. They express their identity in a different way than in reality and are "disguised" behind avatars and nicknames. Such "virtual stages" can be used for a number of educational purposes such as role-playing as part of a history or drama course. Such environments can also be used for teaching stage design. The corresponding facilities and design features to support these activities include e.g. outlook of the place, creating appropriate atmosphere for the role-playing (e.g. historical sceneries), possibilities for flexible collaborative scene modification and a library of props and stages needed in the performance.

The online theatrical performance described in this paper was conducted in 2005. It involved an online production of Plato's Allegory of the Cave as a theatrical performance. Participants from three different continents shared a common project aim – remote collaboration on a single theatrical performance in a 3D CVE. The suite of tools which accompanied the 3D CVE performance was also instrumental in providing a shared workplace. It was found that theatrical activities in a 3D CVE share some of the characteristics of both cinema and traditional theatre. Both provide the audience and actors alike with a presence. Many different types of spaces could be identified within the performance and the production of the online play. From these, and evaluation of the performers' reflective essays, interviews and chat logs, we identified a number of different places: subjective, objective, places for social interaction, and the place in-between the tool and one's imagination. Based in this, we also discussed how the virtual place can act as a theatre drawing parallels to the features available in "real" theatre and cinema. We believe that this discussion is important as 3D CVEs acting as "virtual stages" or "virtual theatres" can provide rich possibilities for supporting social interaction, knowledge construction and identity expression, which is highly relevant in a cross-cultural collaboration and learning. Therefore, the main contribution of this paper is two-fold. First, we explored how modern technology can create virtual places facilitating roleplaying, immersion and storytelling. Second, we illustrated how such a "virtual theatre" can be used as a framework for educational and social activities across cultural and geographical borders.

This paper is organised into five sections. The background section traces the reconceptualisation of notions of space over time and how this informs notions of place, more particularly, notions of place in a 3D CVE. Contingent on notions of place in a 3D CVE is immersion and presence which leads us to notions of theatrical place in a 3D CVE. This is followed by the case study section. This section gives an overview of the setting, the suite of tools used, the project guidelines and the types of places

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encountered in the performance. This section is followed by an evaluation and analysis of some reflective essays submitted by the participant-students, interviews, and chat logs. We then discuss these analyses describing the place-based features of the groupware tools used, and the similarities and differences between the virtual stage in 3D CVE and "real" theatre and cinema. The paper concludes with the educational and philosophical outcomes of conducting the exercise and directions for future work.

II. BACKGROUND: SPACE, PLACE, IMMERSION AND ACTING

Notions of space have been profoundly reconceptualised at different periods in history, (by e.g. Aristotle, Galileo, Descartes, and Einstein [5]). Cyberspace or the space of the Internet is a special case. While we normally conceive of space as a "continuous, albeit abstract, homogeneous void," in cyberspace there is no volume yet we find a presence in it and describe its 'places' and 'paths' as part of an extended urban-like structure [6, p187]. In it we experience a split between the physical and virtual, between body and mind [7].

In this space we find places. Place is an even more difficult concept to understand than space. Philosophers argue that place is an abstract concept invented by those who would try to colonise space (Plato; Kant; Descartes; Lefebvre [8]). Architects design architectural space that people can inhabit (Murcutt; Gehry; Gropius). Urban designers identify spaces as places with paths leading up to, across, through, and around them (see e.g. [9]). Psychologists suggest we memorise places as cognitive maps of our experiences (see e.g. [10]). CSCW designers create computer supported collaborative workspaces where people can meet virtually and exchange ideas, files, notes, and images in places designated for such activities [11, 12, 13]. With the proliferation of the WWW many people now consider the sites they visit on the Internet or in cyberspace as legitimate places.

Of interest to this paper is the role of place in a 3D collaborative virtual environment (3D CVE) which serves as an arena for theatrical performance and acting. What distinguishes and connects 3D CVEs from/to other place-making scenarios is that they tend to focus on spatial models of interaction [14]. Unlike physical-world places, these models of interaction tend to rely on explicating notions of immersion and presence in a 3D CVE.

It is the feeling of immersion that transports us to another place. We can also experience this sense of immersion in our own thoughts or mental space, when we read a book, or play a 3D computer game. In the case of a 3D CVE we can interact directly with other people, objects, and the spaces depicted. As such, we can become immersed in the activities it supports – we may feel like we are 'in' it. Presence, on the other hand, is when we experience the feeling that we are really 'there', in the 3D world depicted [15]. Such experiences tend to suggest immersion and presence are a precondition of place in a 3D CVE.

Theatrical activities in a 3D CVE contain some of the characteristics of both cinema and traditional theatre. It provides the audience and actors alike with a presence. Like theatre or cinema, participants experience 'events' in the abstract Cartesian space of the 3D CVE. Actors act 'in' the space of theatre and they also constitute part of it. As in cinema, the represented space of the 3D CVE allows participants to escape into an imaginary world where the narrative of the play unfolds in real-time. The use of an avatar in a 3D CVE bridges theatre and cinema. The participant's interactions with other props, not usually possible in theatre or cinema, are also how they detect their 'presence' in the world. The place of the theatre can be created, owned, and actively or passively traversed. Unlike traditional theatre, however, it is easier to use the virtual place because in a 3D CVE the actors can walk across relatively large distances, moving from one virtual place to the next; from one stage setting to the next.

III. THE CASE STUDY

A. The setting and tools

In 2005 researchers from Australia, Taiwan, and Norway hosted an online production of Plato's Allegory of the Cave. The participants comprised students from each of the universities. They included:

- multimedia students from Australia learning about designing digital narratives and the technology which supports it;
- computational design students from Taiwan learning about designing in a virtual environment;
- computer science students from Norway taking a CSCW course who acted as an audience and evaluated the effectiveness of a virtual environment for hosting theatrical events.

The 3DCollab provided a vehicle for facilitating collaborative design and theatrical performance across time zones and geographical distances. It comprised three primary groupware applications as listed below (Fig. 1):

- ActiveWorlds G1000 Galaxy Server, running on a Dell PowerEdge 1750 2.8GHz Xeon, with 2GBs of RAM, and 3x72GB SCISI Drive RAID-5 Windows Server 2003;
- Yahoo messenger video conferencing group of tools, chosen because they tended to be robust and easy to install. As a video-conferencing tool, the quality of imagery and frame rate varied depending on bandwidth availability. But, this did not seem to adversely affect the efficiency of the system to mediate social interaction. The Yahoo chat field supported textual communication and graphical emoticons;

- Various email systems were used. As a core asynchronous text and file transfer system they proved faultless.

At times, the students were instructed remotely by the teachers directly within the AWs 3D CVE moving from the Yahoo video, voice, and chat screen to the 3D CVE environment and back. This approach proved to be very effective. For example, students could take the teacher to an object in the scene in the 3D virtual world and describe the problem they were having. The teacher could then walk them through the process on how to fix it.

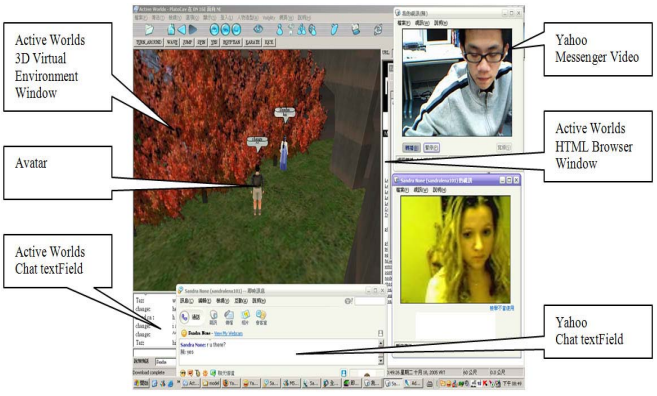

Figure 1. Direct interrelationships between the 3Dcollab suit of tools.

B. *The Project*

The choice of Plato's parable allowed the researchers to draw some parallels between what Plato is saying in the parable and what actually happened in our exercise. In Plato's Allegory of the Cave [16] Plato philosophizes on education as the ascension to the (day)light. More than this, it is an allegory about the ascension to a higher ideal – from darkness to light, and from the light of wisdom, the philosopher takes his message to those in the dark. Plato's parable was divided into 5 acts. The Australian team converted the parable into short play scripts; constructed a virtual version of the cave as described in the parable; and, produced a performance in their virtual stage sets (see Fig. 2, 3, 4). Each section took about one hour to complete. There were up to 40 participants online at the same time. Between each act participants regrouped at the default entry to the AWs 3D CVE where they were met by a guide who took them through a labelled 'teleportal' to the next scene. The Taiwanese team developed an alternative virtual space focusing more on the notions of virtualities than any direct reference to a stage set for a performance of Plato's parable. The Norwegian team evaluated and interacted with the combined Australian-Taiwanese final performance. All teams had access to the same material: Jowett's [16] translation of Plato's Allegory of the Cave; the Active Worlds [4] 3D virtual world environment and tutorials for building in it; Yahoo messenger; and, various email applications.

C. *The Play*

In Act one we were introduced to the Plato parable and a cave setting for his philosophical discussion. The audience could read a scripted dialogue in the chat text field. Debates ensued between the actors (in Australia), the investigators (in Taiwan), and the interlocutors (in Norway). The first act finished with a debate between all these groups on the relative merits of freedom, rights, and responsibilities. This established a performance protocol that was followed in the subsequent acts.

The team for Act two chose to thoroughly contemporize Plato's parable. This act starts out in a suburban house with two occupants discussing the responsibilities of 'getting educated'. The conversation continued with various actors coming and going adding to the conversation (Fig. 2). The audience was encouraged by a guide to keep up with the main actors and to follow the conversation as they wondered the streets. Participants were invited to debate their views on the relative merits of education.

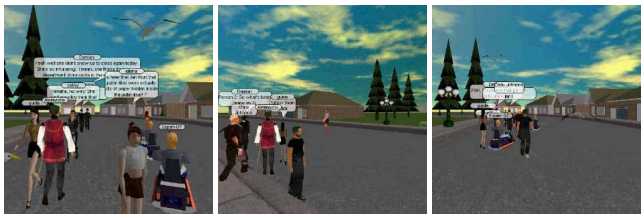

Figure 2. In this scene the actors are walking around the streets and the audience follows them while at the same time carrying on a conversation.

In Act three we started out in a garden setting. In this act the script addresses Socrates' debate with Glaucon on the importance of having knowledge of astronomy. We were instructed to look up at some stars in the sky. We noticed they look flattened, as if painted onto the sky. Moving up into the space of these objects they assumed three-dimensionality not obvious from the ground. This triggered a discussion by most of the participants present on perceptions and how much of what we perceive is merely an illusion. Some participants drew direct parallels with the illusory life portrayed by the shadows on the wall in their version of Plato's cave (Fig. 3).

In Act four, participants were encouraged to stand around a fire inside the cave (Fig. 4). The circle was symbolic of an ancient classroom setting. In this act all participants were encouraged to engage in a debate on notions of the 'self'. This particular act highlighted the potential redundancy of the 3D CVE. Once participants had found their way into the cave and marvelled at its elaborate construction and texturing, most attention was focussed on the textual debate in the chat text field.

In the final Act (five) we began in a columned citadel overlooking an eclectic collection of modern city buildings, streets, and a park. This act completed Plato's parable by addressing the issue of wisdom. This was the last act and many of the participants had been actively online for more than five hours. The group leader sensed the waning

interest and led everyone to an elaborate skate park housed within a virtual warehouse. With loops and ramps, it was quickly taken over by playful activity. It was also a fitting end to the final act's overall theme: 'does wisdom bring happiness?' Everyone agreed that much enlightenment comes from playful activities.

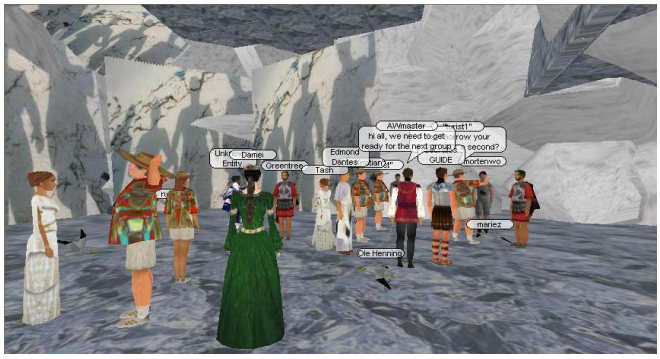

Figure 3. Plato's Allegory of the Cave reconstructed as a stage set in the AWs 3D CVE.

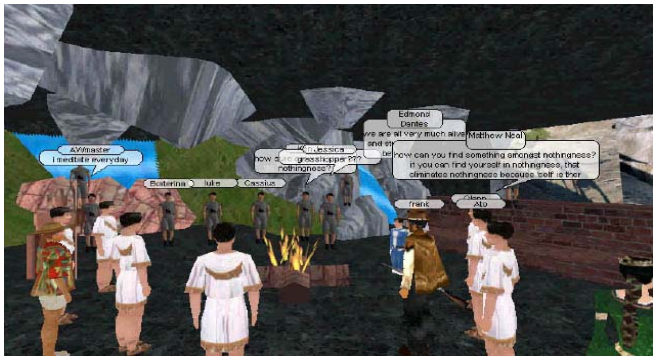

Figure 4. The students discuss deep philosophical notions around the fireplace creating immersion in the unfolding narrative of the allegory

As a group exercise, these activities relied on socialising. But more importantly, 'places' were established as a consequence of the socialising activity. However, it was only on reflection that these places became apparent. It was later, when the students analysed their own involvement in the project – in their reflective essays, from the interviews, or the analysed chat logs – that notions of place emerged. It was clear from their comments that much of the activity occurred in what they freely described as 'places' of social interaction. The following analysis of reflective essays, interview scripts, and chat logs highlights the recorded incidents of immersion, presence, and social interaction which led to a reflective conceptualisation of place in the performative 3D CVE.

IV. Evaluation

To identify notions of 'place' in the 3DCollab we conducted a qualitative [17] analysis of the students' chat logs (Yahoo and AWs), reflective essays, and subsequent post-performance interviews. In the following section the bracketed terms (refl), (int), and (chat) refer to 'reflective essay comment', 'interview comment', and, 'chat log' respectively. Students' names have been omitted to preserve anonymity.

From the students' reflective essays we can find indicators for immersion and presence as a precondition for creating places of social interaction. For example:

- Mood: "The setting… [derived from] the discussion topic, made it easier for us to 'get into'… the right mood, making us feel like we were there in reality" (refl).
- Immersion and presence were evident in a comment on how the urban setting (in Act two) "contributed to the illusion of feeling like really being in a special place in the [virtual] world, and… by the pace of the acting" (refl).
- Two kinds of place were implied by the comment: "the use of [the] virtual environment to introduce Plato's allegory was good… [for] setting the mood, but the discussion… [was] better in the normal chat channel" (refl).

Their comments also indicate another aspect of any theatrical performance – virtual or physical – the importance of the narrative in immersing the audience in the story of the play. This notion of narratological immersion was found in comments that suggested the 3D CVE was an effective tool in communicating the allegory, such as: "the classical interpretation of the allegory [was effectively visualised] by creating the sense of being in a cave and [then] moving out in[to] the open, free world" (refl). Here we detect not only presence and immersion in the virtual world – 'being in' the cave (presence) and 'moving out' (immersion) – but how this experience also facilitated communication of the narrative – the 'free world' is a narratological construct derived from the script not the 3D scene.

Following the performance students were briefly interviewed as a group about their (transformative) understandings about place in a 3D CVE. There were many indicators of placeness embedded in their responses. For example, "we felt obliged to meet in the 3D CVE"… "as our meeting place". It felt as though "it belonged to our group", or "when we found a stranger in the world… [we would] invite them over to 'our place' to see what we'd been doing" (int). From these examples it is clearly the socialisation that was the key factor in placeness. It both constituted the place and was a reason to 'be' or go 'there'.

The chat logs yielded similar references to place-based activities reflected in the terminology they used. For example, I was "showing 'participant A' around" (chat), or I "came here from yahoo [and] met 'participant B' here by chance otherwise the place was deserted" (chat). From these chat excerpts we can see how the participants identified, with some pride, the spaces they created as places with meaning and purpose. This furthered social attachment to

these places and, as an educational outcome, encouraged engagement with the exercise in general.

Finally, students indicated their immersive presence in the 'place' of the virtual world when they reported the revelation that "it was really fascinating to cooperate with students from the other side of the world, and most of the time, this fact was not recognized. Only when the Australians talked about time, it became clear what huge distance was covered by this performance" (refl). It was not until the time difference was discussed that they realised they were not in the same temporal or geographical space but in another kind of place – a temporally-mediated place.

What these reflections indicate is that the 3D CVE offered the ability for the users to conceptualise both the environment and the other users in it. The awareness of other people's presence and their activities was both directly and indirectly essential for the collaboration. The sharing of objects, complemented 'the sense of place' by providing the means to modify and work upon them. This occurred in a mutually agreed meeting and construction place. While the place had coordinates assigned to it, so we could return to it, it was not the spatial characteristics of this place that gave it its 'placeness' but the participants' actions in the space which created what they referred to as a 'place'.

V. Discussion: 3D CVE as theatrical place

From the discussion above we can see that there were multiple instances of placeness in the 3DCollab suit of tools, all contingent on socio-cultural exchange. This exchange occurred at a local level and remotely. The places were as much about information exchange as they were about the construction of knowledge over time within these places and the knowledge gained held some value which acted as a commodity for social exchange to proceed. Central to this knowledge construction and exchange was the play itself. Therefore in the following we discuss the role of the theatrical performance in generating placeness within the 3D CVE and its educational role.

The space of the 3D CVE contained elements of both the traditional theatre and cinema. It provided the audience and actors alike with a presence. Like theatre or cinema, we experienced 'events' in the abstract Cartesian space of the 3D CVE. Participants considered it a 'place' they went to meet others. However, and this is where the parallels with traditional cinema and theatre cease, the subject-object relationship between the participant's 'self', and their representation in the 3D CVE was created by their 'seeing' and interacting with it. This suggests there is some ambiguity between what was real and what was virtual. For example, when we compare the 'space' of the 3D CVE to that of 'theatrical space', we notice neither can be approached, in a physical sense, by the viewer. An actor may be 'in' the space of theatre but they also constitute part of it. Hence, in the 3D CVE, as in theatre, bodies passed from a 'real', immediately experienced space (the room, terminal) to a perceived space at once fictitious and real.

This raises the question whether virtual spaces are (in Lefebvre's [8] terms) representations of space (passively viewed as in a painting) or representational space (actively inhabited by the viewer's imagination and perception, triggering cognitive actions). The virtual space certainly implied a representation of space – scenic space – corresponding to a particular conception of space. Like the theatre, its representational space, on the one hand, was mediated yet directly experienced, it infused the work and the moment, established as such through the action of the participants' moving through the virtual space itself. On the other hand, in Deleuzian [18] cinematic terms, their presence in the 3D CVE intermingled with the subjectivities they saw played out on their interactive screens. As in cinema, the represented space of the 3D CVE allowed them to escape into an imaginary world. However, with the 3D CVE they were in total control. Hence, they 'entered' its representational space – the space beyond representation and immersion invoking a sense of total presence. Still, according to an essay, the virtual play "lacked the anticipation that is connected to a theatre visit: dressing up at home, moving to the theatre, entering the building, seeing the other members of the audience dressed up in a nice environment, going to the seat, waiting for the lights to go off and watching the play".

'What' the students were immersed in was the unfolding narrative of their explorations and interactions with the space, objects in the space, and other interactive entities. These are similar to the narratological structures of theatre and cinema. Where the 3D CVE differed was in the manner that the user was implicated in every role. Like theatre, cinema, or a story, in the 3D CVE the narrative unfolded in real-time. Although, in the case of the 3D CVE, multiple narratives were possible concurrently. What was significant in the 3D CVE was that the avatar's role in those narratives was both explicit and implicit. The avatar 'stood in' for the participant and the participant lived for the moment vicariously through their avatar.

In this sense, two distinct forms of place emerged: the objective place of the props and the spaces set aside in the 3D CVE for socialising; and, the subjective place where the socialising was communicated visually, gesturally, vocally, and textually. Both are present in traditional theatre. In the virtual theatre setting the roles of actor and audience may have been less distinct than in a traditional setting but the meaning of the play was, nevertheless, succinctly communicated through a continuous narrative. Hence, we can say the virtual theatre established a legitimate place for a play to be performed in every sense of its traditional meanings. More than this, it introduced a new form of performance. A form that the students could relate to as it was both of their own making and in a medium that, unlike a traditional theatre, was risk-free, they enjoyed working in, and were familiar with.

VI. CONCLUSION

In this paper, we have reported our experiences with a 3D co-located laboratory (the 3DCollab) that addressed the need for ITC students to practice collaboration remotely. The reported study allowed the exploration of a number of issues related to the notion of place supported by social interaction with groupware tools. As opposed to alternative tools such as 2D chats and forums, the 3D CVE allowed an active social involvement and the visualization and concretization of performed activities to occur in a 'place' central to the pedagogical aims of the exercise. The 3DCollab also allowed exploring the role of such a 'place' for collaborative learning.

The particular case study reported here addressed the notion of theatrical performance and course-related role-playing in a 3D CVE. A 3D CVE was chosen because it was deemed more suitable for representing role-playing and theatrical performances than 2D representation alone. It provided the opportunity to produce a play without the cumbersome organisation of a traditional setting and its physical props. Moreover, role-playing in 3D CVEs is increasingly popular – something many of the participants involved in this exercise were already familiar with. Hence, it capitalised on their prior experiences and as such engendered engagement with the concept.

What emerged from this study was a distinct demonstration of placeness in a 3D CVE. This took a number of different forms: subjective/objective places, places for social interaction, and the place in-between what was depicted on the screen and the immersive narrative of the play itself. As a performance space for Plato's Allegory it sufficed to communicate a story. The educationally transformative outcomes of this were a deeper understanding of the technology used in an environment of which they were in control of the narratives that unfolded. They also gained a critical philosophical appreciation of the epistemology that the technology fosters from the subject matter of the play itself – the projection of abstract realities we only know through the shadows they cast on the monitor. It was truly a journey of enlightenment.

Another important outcome of this research is an elaboration and exploration of the "virtual theatre" concept, its specific features and the corresponding implications for the educational and collaborative process. As online games and other applications where roleplaying is an integral part, gain more and more popularity, the use of "virtual theatre" metaphor in educational situations will be increasingly important. Future work will therefore imply further investigation of the concept of place, especially "theatrical place", in educational 3D CVE and its role in supporting intercultural learning and interaction.

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